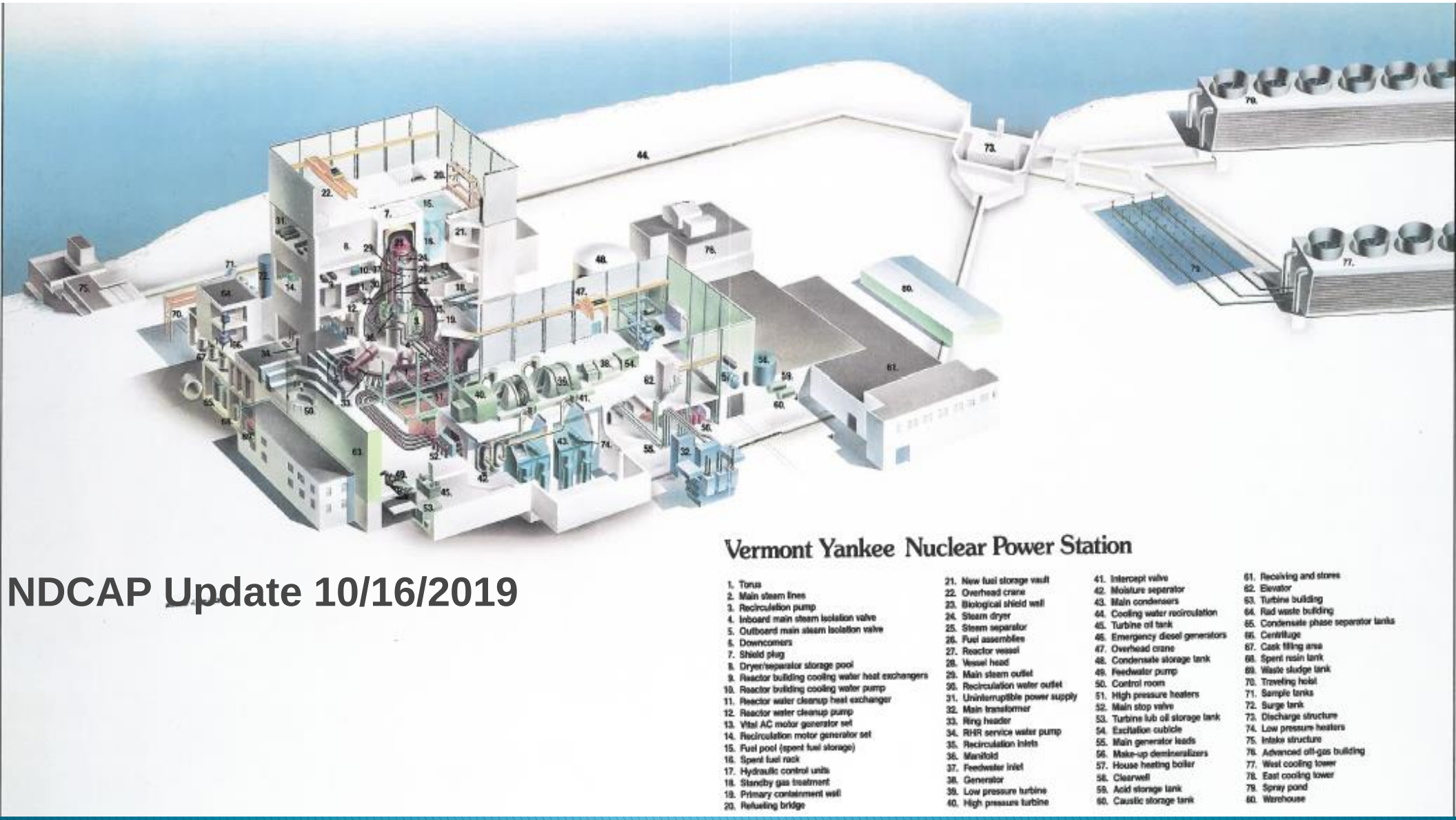
NorthStar VTY Decommissioning



Vermont Yankee Nuclear Power Station

1. Torus
2. Main steam lines
3. Recirculation pump
4. Inboard main steam isolation valve
5. Outboard main steam isolation valve
6. Downcomers
7. Shield plug
8. Dryer/separator storage pool
9. Reactor building cooling water heat exchangers
10. Reactor building cooling water pump
11. Reactor water cleanup heat exchanger
12. Reactor water cleanup pump
13. Vital AC motor generator set
14. Recirculation motor generator set
15. Fuel pool (spent fuel storage)
16. Spent fuel rack
17. Hydraulic control units
18. Standby gas treatment
19. Primary containment wall
20. Refueling bridge
21. New fuel storage vault
22. Overhead crane
23. Biological shield wall
24. Steam dryer
25. Steam separator
26. Fuel assemblies
27. Reactor vessel
28. Vessel head
29. Main steam outlet
30. Recirculation water outlet
31. Uninterruptible power supply
32. Main transformer
33. Ring header
34. RHR service water pump
35. Recirculation inlets
36. Manifold
37. Feedwater inlet
38. Generator
39. Low pressure turbine
40. High pressure turbine
41. Intercept valve
42. Moisture separator
43. Main condensers
44. Cooling water recirculation
45. Turbine oil tank
46. Emergency diesel generators
47. Overhead crane
48. Condensate storage tank
49. Feedwater pump
50. Control room
51. High pressure heaters
52. Main stop valve
53. Turbine lub oil storage tank
54. Excitation cubicle
55. Main generator leads
56. Make-up demineralizers
57. House heating boiler
58. Clearwell
59. Acid storage tank
60. Caustic storage tank
61. Receiving and stores
62. Elevator
63. Turbine building
64. Rad waste building
65. Condensate phase separator tanks
66. Centrifuge
67. Cask filling area
68. Spent resin tank
69. Waste sludge tank
70. Traveling hoist
71. Sample tanks
72. Surge tank
73. Discharge structure
74. Low pressure heaters
75. Intake structure
76. Advanced off-gas building
77. West cooling tower
78. East cooling tower
79. Spray pond
80. Warehouse

NDCAP Update 10/16/2019

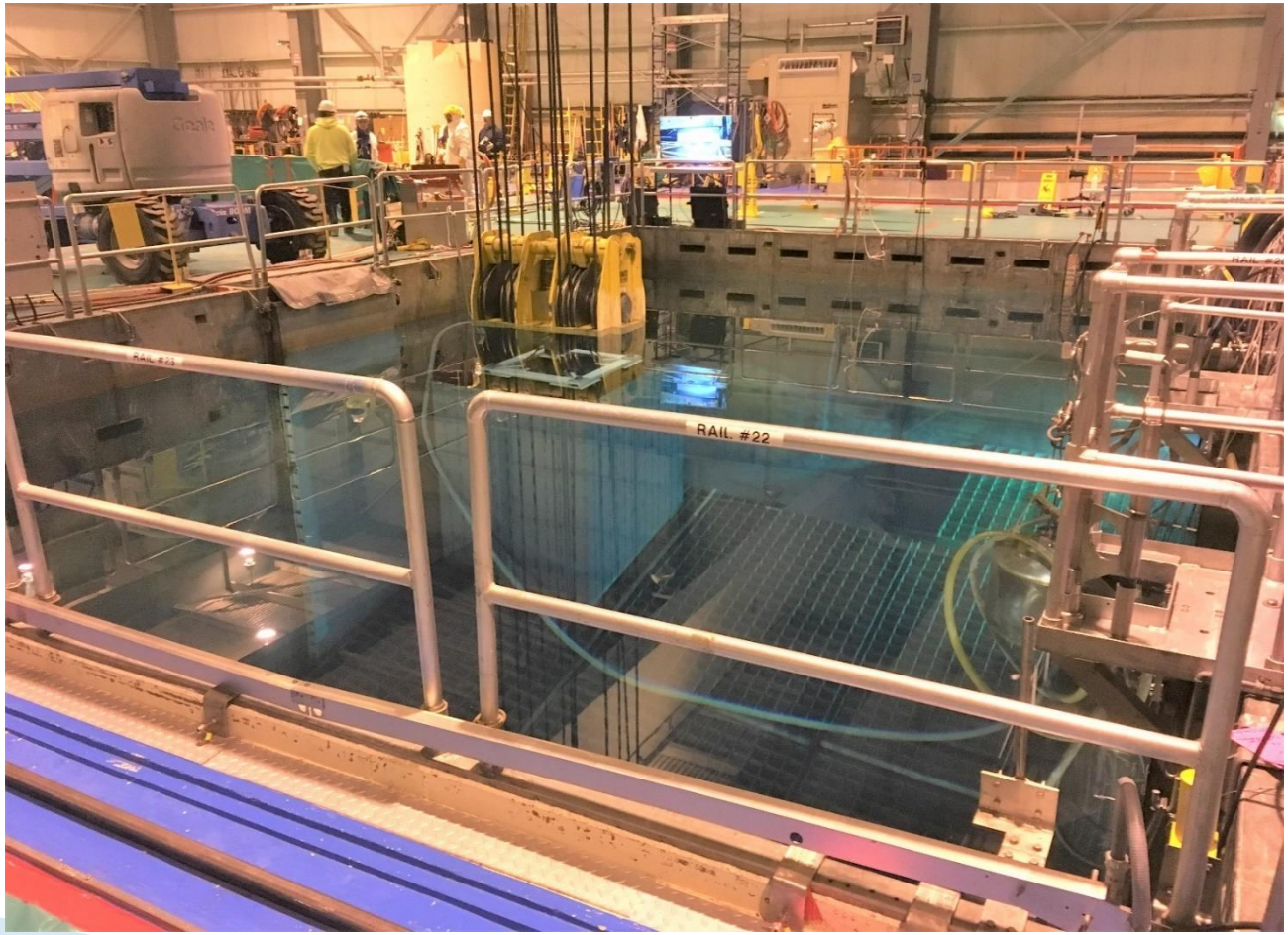
NorthStar Nuclear Decommissioning Company, LLC

Simple Priorities

- **SAFETY with all we do: Target Zero (accidents)**

Radiological, Environmental, Industrial, Nuclear

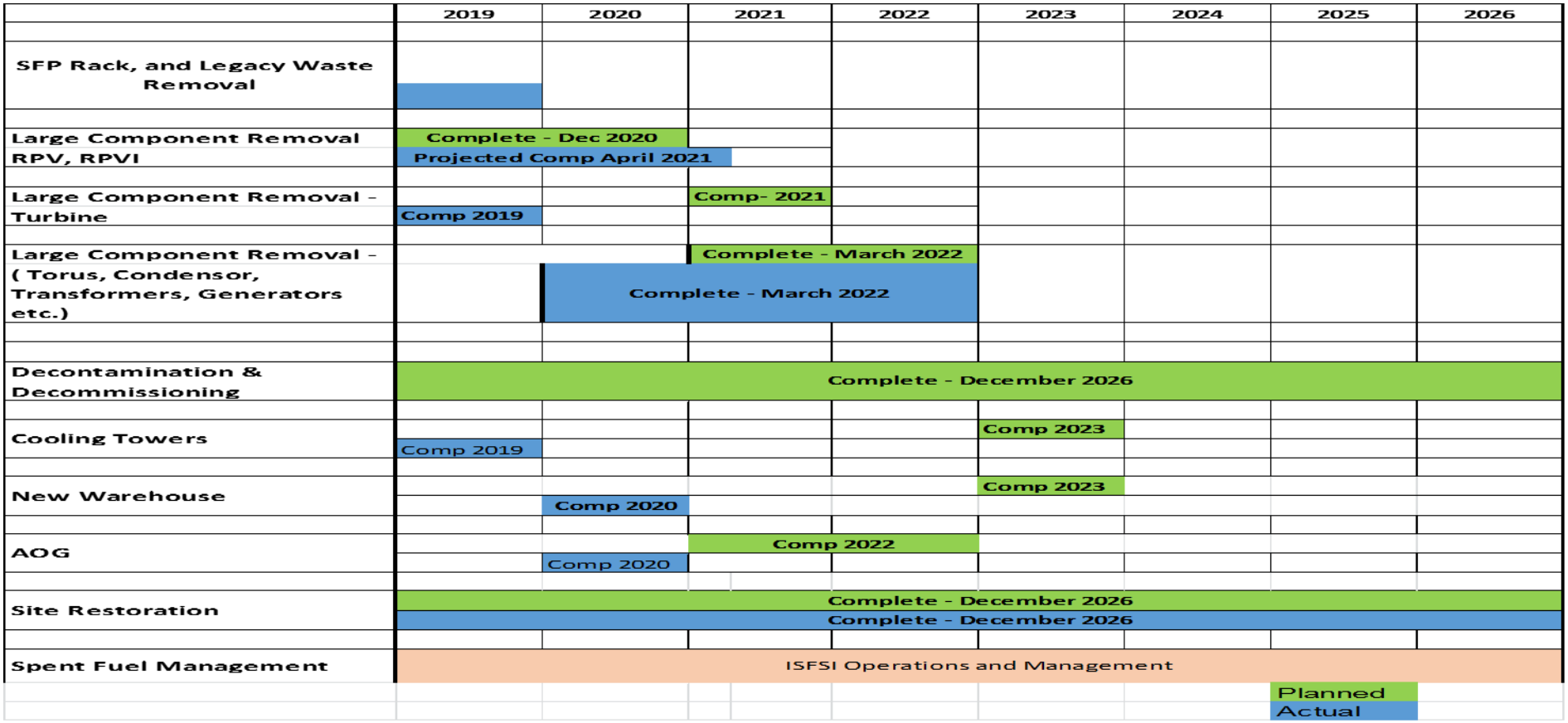
Do it right. Do it safe.



Project Schedule – Overview (Re-Cap)

	NorthStar Ownership (Target 01.11.2018)							Partial License Termination (Target 12.31.2026)					License Termination (Est. 12.31.2052)
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027 to 2051	2052
Dry Fuel Storage Program (Fuel on ISFSI - Dec. 31, 2018)	Completed by Entergy												Final Site Restoration & License Termination
Large Component Removal (RPV, RPVI, etc.)		Engineering & Planning		Complete - March 2022									
Decontamination & Decommissioning		Pre-Closing Work		Complete - December 2026									
Spent Fuel Management				ISFSI Operations and Management (2019 thru 2026)								ISFSI Only Operations Period (2027 thru DOE Fuel Pick-up)	

Project Schedule – 19 & 20 Overview



- Critical Path:
  - Large Component
    - RVI/RV Segmentation – 2019 to 2021
    - Large Components – 2019 – 2022
- 2019 – Turbine Components/Clear Main Turbine Deck (concurrent NS Critical Path)

Performance Update

- SAFETY: Acceptable

Zero NorthStar OSHA Recordable Lost Time Accidents with over 220,000 person hours worked on site YTD.

- Regulatory: GOOD

No Cited or Non-Cited Violations. QA Audits and Peer Benchmarks confirm safe, compliant and conservative performance.

- Production: Acceptable

Overall project schedule on track. Reactor removal project started slightly behind target due to transaction delays. Bulk decom work advancing ahead of initial projections.

Turbine Shroud and Casing size reduction

Size reduced/fixative applied for shipping

Turbine Upper Bearing Case removal

Turbine Upper Bearing Case size reduction

Turbine Steam Line removal

Turbine Diaphragm(s) removal

Turbine Exposed for Segmentation

Turbine Stages/Blading Segmentation

Turbine shaft and couplings cut/removed

Segmented Blades/Stages/Casing Prepped for Packaging

Rail Operations

Covered 4 season structure

Facilitation of Rail loading operations

Rail equip maintenance and mods

Rail Operations

Primarily for loading operations

Staging of materials and equipment

Spur Addition to Improve On-Site Capacity

- Added loop on North end of rail line
- Improved flexibility for rail car operation and staging

Removal of Legacy Waste by Rail

Containers and Flat Cars

- 4 position flat car with containers
- 6 position flat car with containers

This equipment in use for the transportation of containerized DAW shipments as LAW to TSDF for processing from VY site to WCS (Texas)

Material Transport Progress – Legacy Waste

Spent Fuel Racks: Specialty Packaging

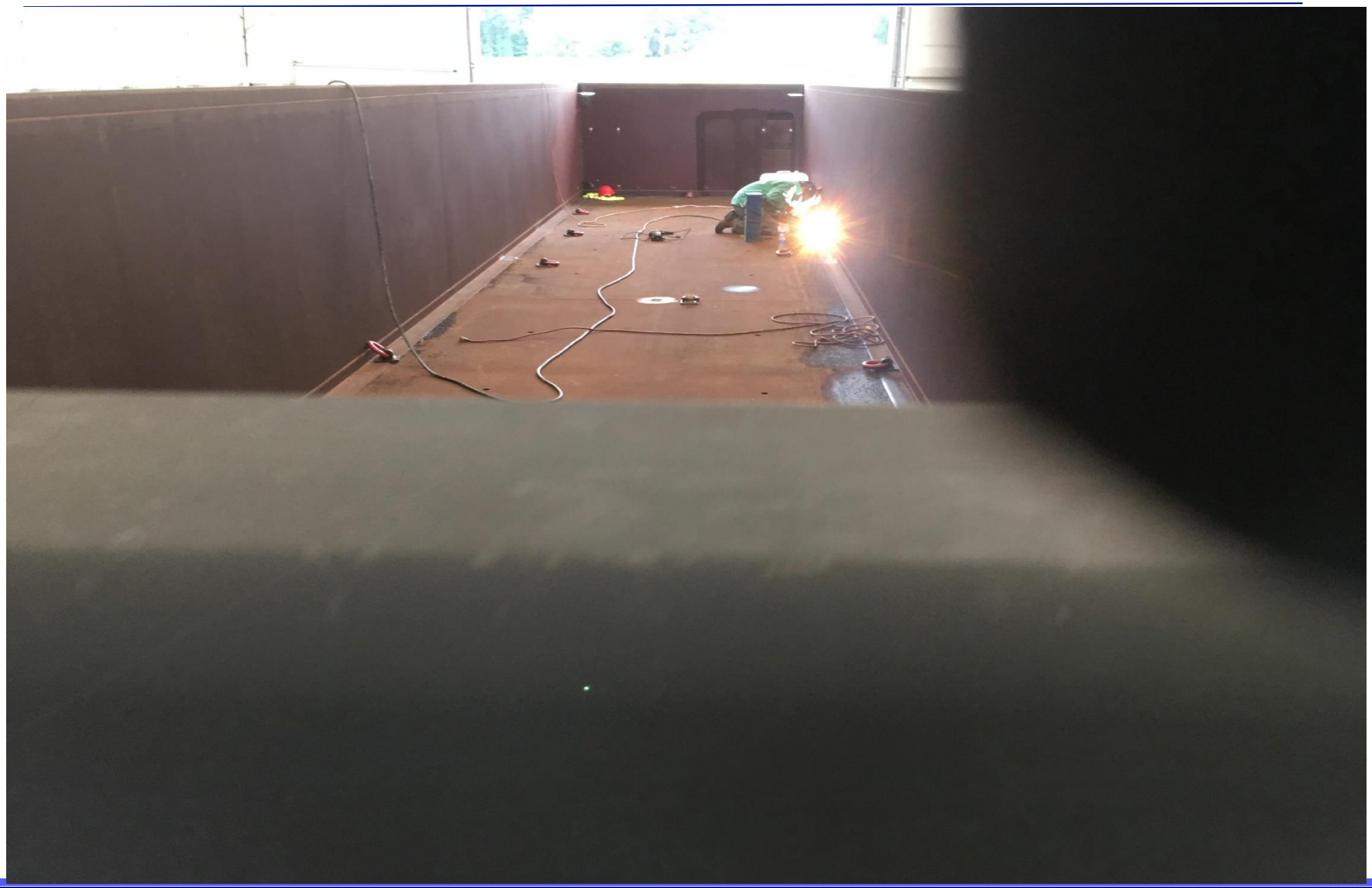
Custom specifications meeting requirements for transportation IAW 10CFR49. (Rail transit regulations)

All liners are manufactured in the United States.

High Sided as well as Standard Gondola Railcar Liners

Spec built Lift fixtures

Gondola rail-car mods for shipping



Rail Transport Operations

DOT exempt liquids tanker

LAW gondola cars

Gondola rail-car shipping

Reactor Vessel Segmentation Update

Containment Head complete, shipped.

Reactor Head complete, packaged and staged for shipment.

Steam Dryer removed, segmented and packaging in process.

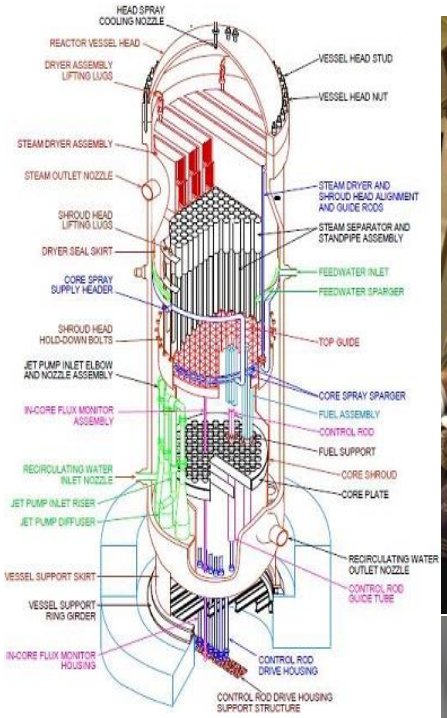
Preps for Flood up and Steam Separator in process. (Remaining components will be done underwater)

Select components within will be cut up and packaged for storage at the ISFSI within a Cask similar to that in which the Spent Fuel is stored.

These components (primarily the upper core grid) have been carefully evaluated, and are designated as Greater Than Class C (GTCC) waste due to their high activation levels.

RV Closure Head | Steam Dryer | Steam Separator | Upper Core Grid | Guide Tubes | Core Plate Assembly | Shroud Cylinder | Jet Pump Assemblies | RV Nozzles | Reactor Vessel

ORANO Segmentation of Reactor and Internals



:Reactor Head
:Steam Dryer

Next up:

: Reactor studs
: Underwater setup
: Steam Separator

How about a little video??

We've been busy little beavers… check this out.

https://youtu.be/S0Vm4MPCGqs

Custom Box preparation for transport

- Custom Box loaded and placed on Storage Pad.
- Grout application for geometry stabilization and shielding prior to transport.

Custom Box preparation for transport

- Custom Box loaded and staged on Storage Pad.
- Grout application for geometry stabilization and shielding prior to transport.
- Special density grout and HEPA application controls

Custom Box preparation for transport

- Custom Box lift fixture and rigging.
- Two crane operations due to weight.
- “Goldhofer” high capacity transfer trailer.
- Approx 250,000lbs.

Custom Box A leaving site

HTS Loading/Operational Testing

- Doors installed
- Cask insertion & Removal Apparatus testing complete.
- Ready for Operation.

WCS Waste Progress – Type B Cask

Truck Transport to CWF of Type B Cask: SFP Filters (Legacy and Prep Work Filters)

RT-100 Cask

RT-100 Cask System

- Will be used for resins and filters
- Secondary waste will be disposed of within this cask
- Owned by WCS
- Provided by NS

Specialty Cask for Rad Shipments by Rail

Cooling Towers as of 5/10/2019

CT-1 demo 7/11, CT-2 demo 7/22

Cooling Towers as of 8-14-19

Cooling Towers as of 8-30-19

QUESTIONS?